UNIVERSITY OF CALIFORNIA, BERKELEY

Final Report on NAG5-665: Participation in the GEMINI Rocket Program

The GEMINI program is a joint effort between national Research Council of Canada and two groups in the United States. The primary goal of the GEMINI program is to provide new measurements from a sounding rocket that can shed new light into the excitation mechanisms of various key emissions observed in the night sky. As such, the experiment consists of a number of spectrographs and photometers all precisely aligned and viewing the Earth's limb to obtain altitude profiles of these emissions.

The original purpose of our effort was to provide technical support in the development of two, two dimensional microchannel plate based imaging detectors using Wedge and Strip readouts, for use aboard the GEMINI sounding rocket payload. Unfortunately, due to funding difficulties on the Canadian side, this plan was aborted in favor of intensified CCD detectors. As luck would have it, in the third year of the program, intensified CCD was discarded in favor of the microchannel plate based system.

We have participated in the design of the optical system and science team meetings held in Ottawa, Canada. We have helped with some theoretical studies of instrument performance and suggested a ground based campaign through the NSF CEDAR program. The GEMINI mission was discussed at the CEDAR annual workshop held in Boulder, Colorado. We now believe that there will be significant ground based optical observations in support of GEMINI from the BEAR Lake observatory operated by the Utah State University in Logan, Utah.

Two publications have described various aspects of the GEMINI mission. In addition, we have conducted some airglow emission analysis using data already present at Berkeley to understand the magnetic storm effects on Far Ultraviolet (FUV) atomic oxygen dayglow 1304Å emissions.

1 List of Publications and Talks in Scientific Meetings

Harris, F. R., S. Chakrabarti, F. Creutzberg, R. L. Gattinger, R. Link, E. J. Llewellyn, I. C. McDade, and W. E. Sharp, GEMINI; introduction to the program, *Fourth Annual CEDAR Meeting, Workshop 11, "GEMINI"*, Boulder, CO, USA, 1989.

Harris, F. R., S. Chakrabarti, F. Creutzberg, R. L. Gattinger, R. Link, E. J. Llewellyn, I. C. McDade, and W. E. Sharp, Ground campaign requirements for GEMINI, *Fourth Annual CEDAR Meeting, Workshop 11, "GEMINI"*, Boulder, CO, USA, 1989.

McDade, I. C., S. Chakrabarti, F. Creutzberg, R. L. Gattinger, F. R. Harris, R. Link, E. J. Llewellyn, and W. E. Sharp , Scientific aspirations for GEMINI, *Fourth Annual CEDAR Meeting, Workshop 11, "GEMINI"*, Boulder, CO, USA, 1989.

Harris, F. R., I. P. Powell, R. L. Gattinger, F. Creutzberg, S. Chakrabarti, R. Link, E. J. Llewellyn, I. C. McDade, and W. E. Sharp, "An Imaging Spectrograph for Visible Airglow Limb Measurements," *EOS Trans.*, 71, 1486, 1990.

Harris, F. R., R. L. Gattinger, I. C. McDade, I. P. Powell, E. J. Llewellyn, J. Yuen, P. Moorhouse, and S. Chakrabarti, "Visible Airglow Limb Imaging Spectrograph for Sounding Rockets," *Proc. SPIE*, 1745, 242, 1992.

Harris, F. R., R. L. Gattinger, I. P. Powell, I. C. McDade, E. J. Llewellyn, J. Yuen, P. Moorhouse, S. Chakrabarti, and W. E. Sharp, "Near-ultraviolet Limb Imaging Spectrograph for Sounding Rockets," *Opt. Eng.*, 32, 3075, 1993.

H. F. Parish, G. R. Gladstone, and S. Chakrabarti, "Interpretation of Satellite Airglow Observations During the March 22, 1979 Magnetic Storm, Using the Coupled Ionosphere-Thermosphere Model Developed at University College, London", *J. Geophys. Res.*, in press, 1993.